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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,270	01/31/2002	Keith W. Holt	01-869	4428

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EXAMINER

TORRES, JOSEPH D

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 06/23/2004

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/066,270

Applicant(s)

HOLT, KEITH W.

Examiner

Joseph D. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 14-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 23-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>3</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-13 and 23-28, drawn to A Method for Data Recovery in a Disk Drive System with Specific Method Steps, classified in class 714, subclass 770.
 - II. Claims 14-22, drawn to A System for Data Recovery in a Disk Drive System with Specific Hardware Components, classified in class 714, subclass 770.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I, A Method for Data Recovery in a Disk Drive System with Specific Method Steps, and Group II, A System for Data Recovery in a Disk Drive System with Specific Hardware and Software Components, are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case Group I, A Method for Data Recovery in a Disk Drive System with Specific Method Steps, does not require the specific hardware and software components of Group II, A System for Data Recovery in a Disk Drive System with Specific Hardware Components, likewise the System can be used to practice other methods than that of Group I.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Pete Scott on 18 June 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-13 and 23-28. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: '220' in Figure 2. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to

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the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because the handwriting in the drawings is difficult to read. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s)

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should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because it exceeds 150 words.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 23-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. MPEP § 2164.08(a) recites: "A single means claim, i.e., where a means recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. In re Hyatt, 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983) (A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor.)". Claim 23 is a single means claim.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites, "the error detection and correction code metadata is controller independent". The Applicant has not specified any relationship between the controller and the error detection and correction code metadata in the previous claim language, hence it is unclear what the relationship between the controller and the error detection and correction code metadata is, hence claim 12 is indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-10, 12, 13 and 23-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwatani; Sawao (US 6023780 A).

35 U.S.C. 102(b) rejection of claims 1 and 12.

Iwatani teaches a method for data recovery in a disk drive system (Figure 10 in Iwatani teaches a disk system comprising error correction data depicted in Figure 5 for use in error recovery), comprising the steps of: reading data from a disk drive (Read Operation 17-5 in Figure 5 of Iwatani is a step for reading data from a disk drive); generating an error detection and correction code from the data read from the disk drive (RP in Read Operation 17-5 of Figure 5 of Iwatani is an error detection and correction code generated from data read from the disk drive); and in parallel with the reading of the data from the disk drive and the generating an error detection and correction code from the data read from the disk drive, reading error detection and correction code metadata (col. 4, lines 39-47 in Iwatani teach that inherent in a RAID-5 system, reconstruction is performed stripe-by-stripe, i.e., a whole strip of data is read; Note: a stripe of data includes n data blocks written to the same address on n different disks and a parity

block for the n data blocks written to the same address on an $(n+1)^{\text{th}}$ disk, hence during read the n data blocks plus the parity for the n data blocks are read simultaneously in parallel, see steps S6 and S7 in Figure 6 of Iwatani for details; Note: The Authoritative Dictionary of IEEE Standards Terms defines metadata as data that defines and describes other data, hence parity is metadata since it is redundant signature data unique within the error correcting capabilities of the code defining a unique codeword and its data within the error correcting capabilities of the parity).

35 U.S.C. 102(b) rejection of claim 2.

Iwatani teaches comparing the generated error detection and correction code of the read data with the error detection and correction code stored as metadata (Read Operation 17-5 of Figure 5 of Iwatani teaches that error detection and correction code metadata P is compared to the generated error detection and correction code RP during the read operation).

35 U.S.C. 102(b) rejection of claim 3.

Iwatani teaches that if the generated error detection and correction code of the read data matches the error detection and correction code stored as metadata, then accepting the data read from the disk drive as valid data (Read Operation 17-5 of Figure 5 of Iwatani teaches that if the generated error detection and correction code RP of the read data matches the error detection and correction code P stored as metadata, then accepting the data read from the disk drive as Consistent, i.e., valid data).

35 U.S.C. 102(b) rejection of claim 4.

Step S9 in Figure 6 of Iwatani teaches that if the generated error detection and correction code RP in Read Operation 17-5 of Figure 5 of Iwatani does not match the error detection and correction code P stored as metadata, then reconstructing data from parity data.

35 U.S.C. 102(b) rejection of claim 5.

CRC Check S10 in Figure 6 of Iwatani is a step for generating a new host CRC check error detection and correction code for the reconstructed data from Step S9 in Figure 6 (see col. 19, lines 55-61 in Iwatani).

35 U.S.C. 102(b) rejection of claim 6.

CRC Check S10 in Figure 6 of Iwatani teaches comparing the error detection and correction code stored as metadata RP in Read Operation 17-5 of Figure 5 of Iwatani with the new reconstructed host CRC check data error detection and correction code (see col. 19, lines 55-61 in Iwatani).

35 U.S.C. 102(b) rejection of claim 7.

Step S11 in Figure 6 of Iwatani teaches that if the error detection and correction code stored as metadata RP in Read Operation 17-5 of Figure 5 of Iwatani matches the new

reconstructed host CRC check data error detection and correction code, then accepting the reconstructed data as valid data (see col. 19, lines 55-61 in Iwatani).

35 U.S.C. 102(b) rejection of claim 8.

Step S10 in Figure 6 of Iwatani teaches that if the error detection and correction code stored as metadata RP in Read Operation 17-5 of Figure 5 of Iwatani does not match the new reconstructed host CRC check data error detection and correction code, then accepting the data read from the data drive as valid data (see col. 19, lines 55-61 in Iwatani; Note: the reconstructed data that is finally accepted after various iterations is data reconstructed from data read from the hard drive: Note also that in the second iteration, if the CRC is corrupted, then the reconstructed data is identically data read from the data drive).

35 U.S.C. 102(b) rejection of claim 9.

Step S10 in Figure 6 of Iwatani teaches that the error detection and correction code is a cyclic redundancy check.

35 U.S.C. 102(b) rejection of claims 10 and 13.

17-5 of Figure 5 of Iwatani teaches that parity is stored in a parity block (col. 4, lines 39-47 in Iwatani teach that inherent in a RAID-5 system, reconstruction is performed stripe-by-stripe, i.e., a whole strip of data is read; Note: a stripe of data includes n data blocks written to the same address on n different disks and a parity block for the n data blocks

written to the same address on an $(n+1)^{\text{th}}$ disk, hence during read the n data blocks plus the parity for the n data blocks are read simultaneously in parallel, see steps S6 and S7 in Figure 6 of Iwatani for details).

35 U.S.C. 102(b) rejection of claim 23.

Iwatani teaches a method for data recovery in a disk drive system (Figure 10 in Iwatani teaches a disk system comprising error correction data depicted in Figure 5 for use in error recovery), comprising the steps of: reading data from a disk drive (Read Operation 17-5 in Figure 5 of Iwatani is a step for reading data from a disk drive); generating an error detection and correction code from the data read from the disk drive (RP in Read Operation 17-5 of Figure 5 of Iwatani is an error detection and correction code generated from data read from the disk drive); and in parallel with the reading of the data from the disk drive and the generating an error detection and correction code from the data read from the disk drive, reading error detection and correction code metadata (col. 4, lines 39-47 in Iwatani teach that inherent in a RAID-5 system, reconstruction is performed stripe-by-stripe, i.e., a whole strip of data is read; Note: a stripe of data includes n data blocks written to the same address on n different disks and a parity block for the n data blocks written to the same address on an $(n+1)^{\text{th}}$ disk, hence during read the n data blocks plus the parity for the n data blocks are read simultaneously in parallel, see steps S6 and S7 in Figure 6 of Iwatani for details; Note: The Authoritative Dictionary of IEEE Standards Terms defines metadata as data that defines and describes other data, hence parity is metadata since it is redundant signature data

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unique within the error correcting capabilities of the code defining a unique codeword and its data within the error correcting capabilities of the parity).

Iwatani teaches that if the generated error detection and correction code of the read data matches the error detection and correction code stored as metadata, then accepting the data read from the disk drive as valid data (Read Operation 17-5 of Figure 5 of Iwatani teaches that if the generated error detection and correction code RP of the read data matches the error detection and correction code P stored as metadata, then accepting the data read from the disk drive as Consistent, i.e., valid data).

35 U.S.C. 102(b) rejection of claim 24.

Step S10 in Figure 6 of Iwatani teaches that the error detection and correction code is a cyclic redundancy check.

35 U.S.C. 102(b) rejection of claim 25.

Iwatani teaches comparing the generated error detection and correction code of the read data with the error detection and correction code stored as metadata (Read Operation 17-5 of Figure 5 of Iwatani teaches that error detection and correction code metadata P is compared to the generated error detection and correction code RP during the read operation).

35 U.S.C. 102(b) rejection of claim 26.

CRC Check S10 in Figure 6 of Iwatani teaches comparing the error detection and correction code stored as metadata RP in Read Operation 17-5 of Figure 5 of Iwatani with the new reconstructed host CRC check data error detection and correction code (see col. 19, lines 55-61 in Iwatani).

35 U.S.C. 102(b) rejection of claims 27 and 28.

Step S11 in Figure 6 of Iwatani teaches that if the error detection and correction code stored as metadata RP in Read Operation 17-5 of Figure 5 of Iwatani matches the new reconstructed host CRC check data error detection and correction code, then accepting the reconstructed data as valid data (see col. 19, lines 55-61 in Iwatani).

Step S10 in Figure 6 of Iwatani teaches that if the error detection and correction code stored as metadata RP in Read Operation 17-5 of Figure 5 of Iwatani does not match the new reconstructed host CRC check data error detection and correction code, then accepting the data read from the data drive as valid data (see col. 19, lines 55-61 in Iwatani; Note: the reconstructed data that is finally accepted after various iterations is data reconstructed from data read from the hard drive: Note also that in the second iteration, if the CRC is corrupted, then the reconstructed data is identically data read from the data drive).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatani;

Sawao (US 6023780 A).

35 U.S.C. 103(a) rejection of claim 11.

Iwatani substantially teaches the claimed invention described in claims 1-10 (as rejected above).

However Iwatani does not explicitly teach that the size of the error detection and correction code metadata is 4 bytes per 512 bytes of data read from the disk drives.

The Examiner asserts that Iwatani teaches n blocks of data are encoded to produce a single parity block. If $n=128$ then the size of the error detection and correction code parity metadata is 4 bytes per 512 bytes of data read from the disk drives, hence 4 parity bytes per 512 bytes of data is a specific embodiment of the teachings in the Iwatani patent. One of ordinary skill in the art at the time the invention was made would

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have been highly motivated to select a specific embodiment based on obvious Engineering Design choice requirements such as data rate and error rate requirements. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of the Iwatani patent by selecting the size of the error detection and correction code metadata to be 4 bytes per 512 bytes of data read from the disk drives. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that selecting the size of the error detection and correction code metadata to be 4 bytes per 512 bytes of data read from the disk drives would have provided the opportunity to implement a specific embodiment of the teachings in the Iwatani patent based on obvious Engineering Design choice requirements such as data rate and error rate requirements.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lubbers; Clark E. et al. (US 5390327 A) teaches meta parity in a RAID system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

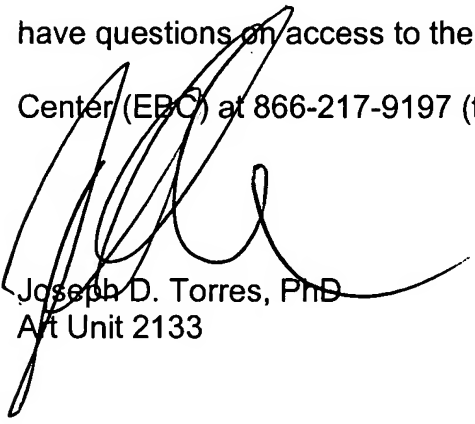
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Joseph D. Torres, PhD
Art Unit 2133